IN THE CLAIMS:

1. A medical device delivery sheath comprising an active member that volumetrically expands and contracts, said active member further comprising an electroactive polymer.

2. The medical device delivery sheath of claim 1, wherein said active member is an annular active member.

3. The medical device delivery sheath of claim 2, wherein said sheath comprises an electrically conductive annular layer outside of said annular active member.

4. The medical device delivery sheath of claim 1, wherein said delivery sheath comprises a plurality of active members.

5. The medical device delivery sheath of claim 1, wherein said electroactive polymer comprises polypyrrole.

6. A medical device delivery system comprising:

an elongate body adapted for insertion into a body lumen, said elongate body having distal and proximal ends;

the medical device delivery sheath of claim 1, wherein said delivery sheath is disposed over said elongate body and is adapted to cover at least a portion of a medical device; and

a control unit electrically coupled to said active member and adapted to apply electrical potentials that are effective to volumetrically expand and contract said active member, thereby actuating said sheath.

7. The medical device delivery system of claim 6, wherein said active member is an annular active member.

8. The medical device delivery system of claim 7, wherein said sheath comprises an electrically conductive annular layer outside of said annular active member.

9. The medical device delivery system of claim 6, wherein said delivery sheath comprises a plurality of active members.

10. The medical device delivery system of claim 6, wherein said electroactive polymer comprises polypyrrole.

11. The medical device delivery system of claim 6, wherein said medical device is a stent.

12. The medical device delivery system of claim 6, wherein said control unit comprises a dc power source and an on/off switch.

13. The medical device delivery system of claim 6,wherein said control unit comprises a microprocessor.

14. The medical device delivery system of claim 13, wherein said delivery sheath comprises a plurality of active members.

15. The medical device delivery system of claim 14, wherein said active members are independently actuated.

16. The medical device delivery system of claim 6, wherein said system comprises a retraction mechanism for retracting said delivery sheath.

17. The medical device delivery system of claim 16, wherein said retraction mechanism comprises an electroactive polymer actuator.

18. The medical device delivery system of claim 16, wherein said retraction mechanism comprises a pull wire.

19. The medical device delivery system of claim 6, further comprising said medical device.

20. The medical device delivery system of claim 19, wherein said medical device is a stent.

21. A method for delivering a medical device to a lumen of a patient comprising:

providing the medical device delivery system of claim 19, wherein said medical device is disposed proximate said distal end of said elongate body and wherein said delivery sheath at least partially covers said medical device;

inserting said distal end of said elongate body into said lumen; and

operating said control unit to actuate said delivery sheath, thereby at least partially disengaging said delivery sheath from said medical device.

22. The method of claim 21, further comprising:

retracting said delivery sheath from said medical device; and

disengaging said medical device from said elongate body.

23. The method of claim 22, wherein said medical device is a stent.